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# PRIORITY CRITERIA IN PROJECT EVALUATION.

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# PRIORITY CRITERIA IN PROJECT EVALUATION

This paper is concerned with the investigation of factors and techniques proposed for establishing priorities of new industrial projects in planning and execution, with special emphasis on priority considerations for developing countries.

Priority factors are first classified, in accordance with their nature, and priority systems are thereafter examined.

It is concluded that, for industrially developing countries, straight ranking of benefits would be more suitable than ranking by benefit ratios, and that priority factors bearing on foreign relations for developing countries may well play a most significant role in project selection for execution.

## INTRODUCTION

An ambitious industrial plan would comprise quite a number of projects having varying features and parameters, a situation which calls for the development of some practical method of selection, from the projects proposed for the industrial plan, of those projects most deserving priority for final evaluation and execution.

An attempt to classify priority factors is herein presented, with particular emphasis placed on those factors mainly pertaining to industrially developing countries as distinct from conventional priority criteria.

Determination of basic financial benefit factors must be based on net improvement, in the light of anticipated conditions in relation to present or previous conditions to be replaced. In case a new industry is established (i.e. an industry which did not exist before), the problem is that of carefully studying of the new project and comparing it with previous import conditions. Should, on the other hand, an extension or an introduction of new processes, operations and machines be involved, the study must deal with both new and existing conditions, in an endeavour to arrive at net benefit or improvement in the plant under consideration.

Improved project analysis is deemed to develop and encourage competition between industrial concerns as regards allocation and utilization of available investment funds. It also provides those responsible for planning and execution with effective means, for rational priority rating through selection of the most promising and most timely projects from the variety of projects proposed.

## NOMENCLATURE

Basic Economic Criteria:

I: Net capital investment

R: Net return or profit (financial benefit) per year

N: Net national income (resulting from new product)

F: Foreign exchange benefit (i.e. value of products consumed locally, which would otherwise be imported, plus value of products estimated for exportation)

D: Annual depreciation

R/I: Profitability ratio (i.e. ratio of net return to capital investment)

N/I: Ratio of national income benefit to capital investment

F/I: Ratio of foreign exchange benefit to capital investment

$\frac{I}{R + D}$: Number of years to repay

Co-efficients for usage of domestic resources:

V: Total value of product

$M_i$: Value of imported raw materials, components and supplies

$M_d$: Value of domestic (local) raw materials, components and supplies

W: Cost of local labour employed in production

P: Cost of motive power consumed in production

$M_i/V$: Imported material co-efficient

$M_d/V$: Domestic material co-efficient

W/V: Labour co-efficient

P/V: Power co-efficient

## Classification of Priority Factors

Priority factors may be classified, in accordance with their nature, into four main groups, namely:

(a) Strategical Factors:

These refer to considerations deemed of primary importance to the industry, e.g. production of basic engineering materials and standardized products. These strategical factors comprise:

(1) Strategical importance to industrial set up.

(2) Relative importance in clearing obstacles facing existing industries.

(3) Timing requirements for inter-related projects.

(b) Economic Factors:

These place emphasis on the effective use of financial resources in producing benefits with a view to improving the economical status of the country. These priority factors include:

(4) Profitability or net return on capital investment, R.

(5) Improvement in national income, N.

(6) Savings in foreign exchange (i.e. improvement in balance of payments position in foreign exchange), F.

(7) Relative size of individual projects, as measured by the amount of their benefits.

(8) Immediacy (or otherwise deferment) of financial return (for fit into the economy).

(c) Availability Factors:

These factors, though intangible and subject to judgement, may have a decisive influence on project evaluation. They include:

(9) Availability/Usage of local raw materials ($M_d/V$) such as iron ore, cotton, vegetables, etc., the degree of the availability assuming one of several forms, viz.:

(i) Materials available in both quantity and quality;

(ii) Materials available in quantity, but not in quality;

(iii) Materials available in quality though quantity has to be increased;

(iv) Materials shall be available on completion of some other projects;

(v) Materials available, but quantity has to be supplemented by importation ($M_i/V$).

(10) Availability/Employment of manpower (W/V). The degree of availability of skilled and/or unskilled personnel varies in accordance with the nature of industry and technical capacity of the country; it takes one of the following forms:

(i) Manpower available in both number and skills needed;

(ii) Manpower available in number, though specific skills have to be developed,

(iii) Number has to be increased by development of skills;

(iv) Local manpower has to be supported by experts brought in for specific lengths of time.

(11) Availability of Motive Power (P/V). This includes the availability of fuel such as petroleum products, coal and uranium, also the availability of water falls for power generation. (A striking example in the UAR of the influence of the availability of motive power on project evaluation is the rapid development of Aswan into an industrial town, on account of the availability of electric power on completion of the High Dam project).

(12) Availability of Transportation. Facilities, such as rail, road and river transport, also the existence of harbours.

(13) Availability of Domestic/Export Markets, which factor is most significant in deciding on the initiation and extent of the particular industry.

The assurance of existing and/or prospected markets is affected by various considerations which include:

For Domestic Markets:

(i) Production of goods being so far imported;

(ii) Expansion of existing industries;

(iii) Creation of new industries.

For Export Markets:

(i) Expansion of volume of present exports;

(ii) Improving and/or advancing quantity and utility of exported articles;

(iii) Processing imported goods for re-exportation;

(iv) Processing available materials not yet being exported.

(14) Availability of local faculties for design and creative work.

Priority may be given to certain industrial projects for which experiences and capacity for creative work are available. To name but a few of those industries calling for special creative talents such as toy industries, and those bearing on artistic abilities such as ornamental industries. A further example would be the watch-making industry which depends on specific experiences and abilities.

On execution of an industrial plan, factors other than those given above have to be taken into consideration, particularly in as far as industrially developing countries are concerned. These additional factors may be grouped as follows:

(d) Factors relating to Foreign Relations:

These comprise three factors, namely:

(15) Availability of foreign exchange for investment and running of project (in case materials, supplies and experiences continue to be imported after execution and putting into operation of the project).

(16) Availability of financial facilities. Facilities offered by governments, concerns and individuals would, no doubt, be a prime factor in the selection of project for execution.

(17) Availability and interest of foreign concerns for co-operation. Particular interest in certain industrial projects as shown by co-operating concerns would be quite decisive in priority measures for project execution.

It is worthy to point out that this group of factors bearing on foreign relations may well impose serious deviations from priority ranking based on conventional priority factors. This is particularly true for the case of industrially-developing countries, for which decisions taken are mainly based on judgement, rather than on mathematical manifestations of priority criteria.

## PRIORITY RATING SYSTEMS

For the ranking procedure, of priorities, two basic systems are available, namely:

I. Straight Ranking of Benefits:

This is the simpler of the two rating systems under consideration, in which benefits appear of equal weight in and have equal influence on the final rating of the project. The system, by virtue of its simple nature, is particularly suited for the analysis of projects with data imperfections, and may thus be convenient for adoption by developing countries.

II. Ranking by Benefit Ratios:

In this more complex system, benefits are formulated in terms of ratios which are then added into a single rating factor. This system is bound to be based on fairly accurate data of the project, a case favouring advanced industrial planning.

Benefit ratios may be found quite effective in emphasizing differences between benefits and in carrying them directly into the final rating. Basic benefit ratios used in this system include:

(i) Ratio of Profitability to capital investment, (R/I);

(ii) Ratio of National Income benefit to capital investment, (N/I); and

(iii) Ratio of Foreign Exchange benefit to capital investment, (F/I).

A final benefit rating factor, based on the above-mentioned benefit ratios, may be put into the integrated form $(R + N + F)/I$.)

This factor may further be adjusted to its present value, on the fourth priority factor of the number of years required for the complete execution of the project (at 10 per cent compounded annually). Adjusted values may then be used for priority ranking of projects within the same group of industries.

Should the influence of domestic raw materials usage (viz. $M_d/I$) be taken into consideration, the following effects would result:

(a) Tendency to weaken comparison of final benefit rating factors between projects in different industries, owing to the fact that the factor $(M_d/I)$ is rather of a characteristic nature, i.e. in as much as low- or high-cost material is involved in the industry concerned.

(b) Distortion of the ratio of national income benefit to capital investment, as the inclusion of raw material factor would let the value of national income benefit approximate net sales instead.

(c) Introduction of the factor $(M_d/I)$ does not display a factor so statistically refined as the three basic economic factors given above.

Adjustment for size of project would nullify the purpose of ratio analysis, since it would upset the measure of relative effectiveness of projects in their use of capital in the attainment of desirable benefits (irrespective of project size).

It is worthy to point out that a wider range of priority factors for project evaluation would be desirable; this necessitates, however, rather refined project analysis data, which may not be readily available, especially in industrially developing countries.

For final evaluation of project priority, the relative value, per final unit of product, of materials and supplies ($M_i/V$ and $M_d/V$), wages of local labour employed ($W/V$) and cost of motive power consumed ($P/V$) would furnish co-efficients and measures of only limited usefulness for comparison between projects. This is due to the fact that such co-efficients may quite widely vary from industry to industry in accordance with the nature of product and processes involved.

## DISCUSSION OF PRIORITY RATING SYSTEMS

In this paper, the two basic systems of priority ranking have been investigated and evaluated in the light of the extent of their applicability to developing countries.

As priority factors, however, are diversified in nature and measure, it seems that a relevant rigourous mathematical handling of the problem would hardly be of any significant practical feasibility. This lack of accurate and reliable priority rating would, as yet, leave the door open to expert judgement, estimation and arbitrary weighing.

In this respect, it is worthy to quote from the presidential address presenting the 1963-1967 Five-Year Socio-Economic Plan in the Philippines, concerning the declining importance of mathematical priority formulae:

> "Reliance on mathematical formulae for priorities in industrial projects does not assure successful economic planning."

Developing countries may be recommended not to place much emphasis on mathematical formulation of priority criteria, but rather to have projects and planning integrated with over-all objectives, these may include:

(a) Direction of available resources to most productive uses;

(b) Conservation of foreign exchange;

(c) Maximum utilization of domestic materials, man and motive power;

(d) Promotion of national income and economic growth.

Of particular interest to developing countries, especially for project selection for execution, are priority factors connected with foreign relations, namely the availability of foreign exchange, financial facilities and interest of co-operating concerns. These factors may well prove most decisive in project evaluation. Second in importance to these priority factors, are the economic factors, viz. net return on capital investment, improvement in national income and savings in foreign expenditure.

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